

Amendment to Claims

1-12 (canceled).

13 (previously presented): The apparatus of Claim 52 wherein the article has a first, substantially planar, surface facing the rotational member and a second, substantially planar, surface opposite to the first surface, and the rotational member contacts the first surface of the article but not the second surface of the article when the article is held by the end effector.

14 (canceled).

15 (previously presented): An apparatus comprising an end effector for transporting articles between different stations, the end effector holding an article as the article is being transported between different stations, the end effector comprising:

a rotational member for contacting and rotating an article held by the end effector;

a body relative to which the rotational member and the article held by the end effector are rotatable; and

a device for pressing the article against the rotational member when the end effector is holding the article;

wherein the device comprises a vortex chuck mounted in the body to emit a gas vortex towards the article.

16 (previously presented): The apparatus of Claim 15 wherein the article held by the end effector is rotatable by the rotational member around an axis passing through the article.

17 (previously presented): The apparatus of Claim 52 wherein the first axis passes through the article when the rotational member rotates the article.

18 (previously presented): The apparatus of Claim 52 wherein the body comprises a device for pressing the article against the rotational member when the end effector is holding the article.

19 (previously presented): The apparatus of Claim 52 further comprising a vortex chuck to emit a gas vortex towards the article to press the article against the rotational member.

20 (previously presented): The apparatus of Claim 19 wherein the vortex chuck is mounted in the body of the end effector.

21-24 (cancelled).

25 (previously presented): The apparatus of Claim 13 wherein in addition to being rotatable around the first axis, the rotational member is movable relative to the body in a direction away from the article to yield when the article is held by the end effector and the end effector presses the second surface of the article against a third surface not belonging to the article and not belonging to the end effector.

26 (previously presented): The apparatus of Claim 25 further comprising a spring plate rigidly attached to the body and contacting the member on a side opposite from the article, to prevent uncontrollable rotation of the member and to allow the member to yield when the article is pressed against the third surface.

27 (previously presented): The apparatus of Claim 52 wherein the articles are semiconductor wafers.

28 (previously presented): The apparatus of Claim 52 wherein the different stations include one or more of: a wafer storage cassette, a wafer shipment container, an etching station, a deposition station, a film frame machine for attaching adhesive film frames to wafers, a dicing station.

29 (previously presented): The apparatus of Claim 52 further comprising a robot comprising an arm to which the end effector is attached.

30 (previously presented): The apparatus of Claim 54 wherein the apparatus is programmed to:

pick up an article by the end effector from a first station;

carry the article to a second station comprising the rotation device to perform a rotational orientation of the article in the end effector without the end effector releasing the article; and

after the rotational orientation, carry the article in the end effector to a third station.

31 (previously presented): The apparatus of Claim 30 wherein the apparatus is programmed to place the article at the third station, the article remaining in the end effector from the time the article was picked up at the first station and up to the time the article is placed at the third station.

32 (previously presented): The apparatus of Claim 15 wherein the articles are semiconductor wafers.

33 (previously presented): The apparatus of Claim 15 wherein the different stations include one or more of: a wafer storage cassette, a wafer shipment container, an etching station, a deposition station, a film frame machine for attaching adhesive film frames to wafers, a dicing station.

34 (previously presented): The apparatus of Claim 15 further comprising a robot comprising an arm to which the end effector is attached.

35 (previously presented): The apparatus of Claim 15 wherein the apparatus is programmed to:

pick up an article by the end effector from a first station;

carry the article to a second station to perform a rotational orientation of the article in the end effector without the end effector releasing the article; and

after the rotational orientation, carry the article in the end effector to a third station.

36 (previously presented): The apparatus of Claim 35 wherein the apparatus is programmed to place the article at the third station, the article remaining in the end effector

from the time the article was picked up at the first station and up to the time the article is placed at the third station.

37 (previously presented): The apparatus of Claim 13 wherein the device emits a gas flow that flows towards the article through an opening in the end effector to draw the article towards the end effector.

38 (previously presented): The apparatus of Claim 15 wherein the rotational member is movable relative to the body in a direction away from the article to yield when the end effector is holding the article and is pressing the article against a surface not belonging to the article and not belonging to the end effector.

39 (previously presented): The apparatus of Claim 38 further comprising a spring plate rigidly attached to the body and contacting the member on a side opposite from the article, to prevent uncontrollable rotation of the member and to allow the member to yield when the end effector is holding the article and is pressing the article against the surface not belonging to the article and not belonging to the end effector.

40 (previously presented): The apparatus of Claim 17 further comprising a device for emitting a gas flow that flows towards the article through an opening in the end effector to draw the article towards the end effector

41 (previously presented): The apparatus of Claim 52 wherein the rotational member is movable relative to the body in a direction away from the article to yield when the end effector is holding the article and is pressing the article against a surface not belonging to the article and not belonging to the end effector.

42 (previously presented): The apparatus of Claim 41 wherein the end effector further comprises a spring plate rigidly attached to the body and contacting the member on a side opposite from the article, to prevent uncontrollable rotation of the member and to allow the member to yield when the article is pressed against the surface not belonging to the article and not belonging to the end effector.

43-44 (canceled).

45 (previously presented): The apparatus of Claim 52 wherein the rotating article is stationary relative to the rotational member.

46 (previously presented): The apparatus of Claim 53 wherein the member is movable relative to the body in a direction away from the article to yield when the end effector is holding the article and is pressing the article against a surface not belonging to the article and not belonging to the end effector.

47 (previously presented): The apparatus of Claim 46 wherein the end effector further comprises a spring plate rigidly attached to the body and contacting the member on a side opposite from the article, to prevent uncontrollable rotation of the member and to allow the member to yield when the article is pressed against the surface not belonging to the article and not belonging to the end effector.

48 (previously presented): The apparatus of Claim 45 wherein the articles are semiconductor wafers.

49 (previously presented): An apparatus comprising an end effector for transporting articles between different stations, the end effector holding an article as the article is being transported between different stations, the end effector comprising:

a body;

a rotational member coupled to the body and rotatable relative to the body, for contacting the article held by the end effector and for rotating the article around an axis passing through the article; and

a device for pressing the article against the rotational member;

wherein the rotational member is movable relative to the body in a direction away from the article to yield when the end effector is holding the article and is pressing the article against a surface not belonging to the article and not belonging to the end effector.

50 (previously presented): The apparatus of Claim 49 further comprising a spring plate rigidly attached to the body and contacting the member on a side opposite from the

article, to prevent uncontrollable rotation of the member and to allow the member to yield when the article is pressed against the surface not belonging to the article and not belonging to the end effector.

51 (previously presented): The apparatus of Claim 15 wherein the end effector is operable to hold the article without the body contacting the article.

52 (currently amended): An apparatus comprising an end effector for transporting articles between different stations, the end effector holding an article as the article is being transported between different stations, the end effector comprising:

a body; and

a rotational member rotatable relative to the body around a first axis which is stationary relative to the body, ~~the rotational member being rotatable relative to the body when the rotational member rotates around the first axis, the rotational member being for contacting and rotating the article held by the end effector around the first axis, the article being rotatable relative to the body when rotated around the first axis.~~

53 (previously presented): The apparatus of Claim 52 wherein the end effector is operable to hold the article without the body contacting the article.

54 (previously presented): The apparatus of Claim 52 wherein at least a portion of the rotational member is operable to be contacted by a rotation device external to the end effector, wherein the rotation device is operable to rotate the rotational member to cause the article to rotate around the first axis as the article is held by the end effector, wherein the end effector is operable to travel with the article to the rotation device to perform a rotational orientation of the article with the article held by the end effector, and the end effector is operable to travel with the article away from the rotation device.